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ABSTRACT

This paper presents a methodology for developing a framework that can help decision makers distinguish intensity of needs and regional funding differences within a state. A cluster analysis was used to distinguish need in Georgia's 159 counties. Four clusters that identified the distribution of goods or services to those in need were identified: (1) low educational achievement, sparsely populated; (2) high unemployment, rural; (3) urbanized; and (4) "typical" rural. A detailed discussion of the methodology describing the unit of analysis, selection and preparation of variables, factor analysis, and cluster model determination is provided. Advantages of the typology are that it organizes many variables into a small number of groupings and uses inductive techniques that limit researcher bias. Two suggestions for determining the distribution of resources are offered: to use a weighted per-capita figure, or to use a per-capita basis with individual agencies establishing a separate fund to be allocated according to need. Finally, the framework helps agencies to focus on the critical needs of counties. Six tables and a map of Georgia counties are included. (Contains 17 references.) (LMI)

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A Framework for Distinguishing Intensity of Need and Regional Differences of Funding Regions

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A Framework for Distinguishing Intensity of Need and Regional Differences of Funding Regions

The purpose of this paper is to present a methodology used to develop a framework that may assist decision makers in distinguishing intensity of needs and regional differences within a state. This paper presents the rationale for developing the framework, the method of developing the framework, an example of using the method, and possible applications.

Currently decision makers rely on either single indicators to assess resource allocation needs in funding regions or use multivariate profiles that tend to become complex as additional indicators are included. The most commonly used single indicator is a population figure and the two most commonly used population figures are the target population or the demand population (Hunter & Harman, 1985). The target population is the total number of persons eligible for a given program in a service or funding area, and demand population is the total number of persons served by the program in a given service or funding area.

With a target population, those service or funding areas with the largest population receive the largest amount of state financial support. The use of a target population assumes operating expenses are the same across the state and that the per resident amount is sufficient in providing the same quality of education across the state (W. Wilson, personal communication, April 13, 1990).

With demand population, those service or funding areas with the largest population using the program receive the largest amount of financial support. This method also assumes that operating expenses are the same across the state. Both methods of funding limit the achievement of program goals and may not best meet the needs in a service or funding area.

Limitation of Population

One result of funding policy based primarily on demand and target populations is not necessarily an inadequate distribution of resources to educational programs, but rather, is a limitation of the achievement of one of the state's major concerns and obligations. This concern and obligation relate to the personal development and welfare of the residents of the state. Programs in areas of high target populations, receiving a larger proportion of funds as compared to low target population areas, are able to provide their clientele with diverse programs and operate with adequate equipment, supplies, and quality staff. The same holds true for those institutions that have large demand populations. In the low target population areas (often rural areas) and institutions with low demand populations, a smaller amount of resources are allocated, decreasing the ability of the education provider to offer a wide range of programs and operate with adequate materials. The operating costs for each student in the lower target population areas are higher than they are in higher target population areas making it difficult to provide adequate educational opportunities when the funds are allocated without an adjustment for differences in the cost per student (Bowen, 1980; Mitzel, Best, & Rabinowitz, 1982; Salmon, 1980).

Using population as the basis for deciding the amount of resources distributed to programs or counties does provide an objective statistical criterion to guide funding decisions. Using population, however, does not "penetrate deeply into the essential nature of societies or reveal their salient similarities or contrasts" (McKinney, 1966, p. 256). The implication of using population as the basis for allocating resources is that each education program or county is considered to be identical socially and economically and that the per

capita demand or target population distribution of resources will meet educational needs. Yet the ability of a provider to effectively meet the educational needs of clientele is affected by the social and economic conditions in the area that the agency is serving and this area is defined by more than the number of residents or by the number of students enrolled. McKillip (1987) noted that "no single indicator nor criterion measures a construct perfectly. Multiple indicators of need are more likely than single indicators to present an accurate measurement of a construct" (p. 27). Thus, each area, whether they have target populations of equal size, varies from other areas due to diversity found in terms of the characteristics of the residents (e.g., age, educational level, and average personal income level), the industrial base (e.g., unemployment rate, number of industrial establishments, and types of industrial establishments), and the standard of living (e.g., crime rate and poverty rate). Thus to better meet the educational needs of county residents, comparative social and economic profiles of funding recipients need to be developed.

Following are two fictional examples of how the use of target and demand populations may mask the diversity found in funding regions and limit achievement of program goals.

Illustrations of Two Common Funding Schemes

Illustration #1: Per Capita Allocation of Public Funds

Orange and Tioga are two fictional counties located in the same fictional state, each with approximately 1,500 people residing within their county boundaries. The state legislators have determined that in order to allocate resources among all state residents, $50 per resident would be adequate funding for the operation of each county's adult

literacy program; however, due to the finite resources they have available, $20 per person will be the allocated amount. Thus, both Orange and Tioga County receive $30,000 per year for adult literacy education.

The residents of Orange County rarely participate in the adult literacy program; the educational level of the county is relatively high and the high school dropout rate is quite low. The residents of Tioga County however, have generally low educational attainment levels. The adult literacy program in Tioga is over enrolled and has a long waiting list.

Because of their differing circumstances, the Orange County Adult Literacy Program has overample resources for operations, while Tioga County is continually operating in the red and cannot hire the staff or purchase the materials required to meet the literacy education needs of the residents.

With increased support from the state, Tioga County could more adequately meet the literacy needs of its residents. This would require those making decisions on resource distribution to examine and describe the population and county rather than simply count the number of people residing in a county. Instead of providing the two counties with an "equal allocation" of $20 per person, the state legislators could examine the population according to the comparative literacy needs of each county--and that county's ability to meet these needs--and distribute finite resources accordingly to meet identified needs. The current per capita allocation system could be replaced with a system based on "allocation according to relative need," thus distributing financial

resources where there is a demonstrable need for a greater concentration of educational funds.

Illustration #2: Enrollment-Based Allocation of Public Funds

In a different fictional state, finite resources are distributed according to the number of people actually using the adult literacy services. This state contains 100,000 people who are eligible for publicly sponsored adult education. Shelby County contains 10% (10,000) of these people. Of these 10,000 people, 20% (2,000) participate in adult literacy education. For each enrolled participant, the state distributes $80 even though $120 is the necessary minimum for adequate service; consequently, the Shelby County Adult Literacy Program receives $160,000 from the state, while the program actually costs $240,000 to operate. However, because this County is a highly populated county, it has a large tax base, diverse manufacturing facilities and high per capita income levels, the adult literacy agency is able to obtain additional funds from local government and private donors. Shelby County's program grows larger and stronger each year and the County's illiteracy problem is steadily decreasing.

Cambria County, on the other hand, contains 5% (5,000) of the state's eligible population. Of these 5,000 people, only 5% (250) are currently participating in the program. The $80 per student the state provides yields a total operating budget of $20,000. Moreover, because the economic situation of Cambria County is poor, the program has to operate within this budget, with little support from local money. As a result, the Cambria County Adult Literacy Program is barely surviving and program

growth cannot occur. With state funds tied to participation--rather than need--and the lack of local support, Cambria County's literacy problem becomes worse each year.

The implications of the fictional situations are very real. In order to provide an actual example of the inadequacy of depending primarily on population, one pair of actual Georgia counties was selected from the *Georgia County Guide* (Bachtel, 1990). These counties, Rockdale and Bartow, have similar populations. Relevant statistics on the two counties are presented in Table 1.

Rockdale County is a rapidly growing county located in the Atlanta metropolitan statistical area and has 62 more residents than Bartow County (see Table 1). Bartow County is located northwest of Rockdale County and is adjacent to the Atlanta metropolitan statistical area. There are approximately 5% more people living below poverty in Bartow and they are making approximately $4,000 less per year than Rockdale residents. The residents of Rockdale are more likely to have graduated from high school than residents of Bartow, where 60% of the residents have not graduated from high school. A further examination of the counties shows that Bartow County children scored lower on the Basic Skills test than the Rockdale County children.

If a per capita amount were provided for educational programs--without considering the social and economic realities--both counties would receive similar allocations from the State. By providing equivalent funds to both counties, inadequate support is received by Bartow County, which exhibits a greater need for publicly supported adult education programs. Thus, the ability of the program providers to meet the educational needs of Bartow County residents is limited.

Multivariate profiles, on the other hand, can present a more detailed description of the social and economic conditions of the counties by examining many meaningful distinguishers that are related to social and economic conditions. The advantage of a multivariate profile over that of a single variable profile is a more accurate and comprehensive description of the county, allowing decision makers to recognize comparative needs of those counties.

Traditionally, attempts to develop multivariate profiles have been accomplished deductively. This method of deriving a profile assumes that all the chosen variables and levels (e.g., high, moderate, and low) are essential to the profile.

Deductively derived profiles are limited in the number of variables that can be included in the analysis because they tend to become quite complex as additional variables are included. For instance, if three variables were chosen and three levels were considered for each variable, 27 possible groupings would be derived (see Table 2).

The alternative method chosen to develop a multivariate profile results in a sophisticated framework, which uses inductive techniques which limit researcher bias, and examines data that are theoretically linked to the issue of concern. The method used was cluster analysis, which formed a small number of descriptive groupings. With these groupings one can still recognize areas of greatest need.

For instance, in this situation four clusters were found for the 159 counties in Georgia while using three variables and two indices (see Tables 3-6). Interpretation of the clusters will vary with the agency and its mission or values. The interpretation that follows is based on the concept of distributive justice, which deals with the distribution of

goods or services to those in need, such that this need is addressed and the people who had experienced the need have benefitted (Deutsch, 1985). For those agencies operating from the standpoint of distributive justice, the following interpretation may hold true.

For such adult education agencies, Cluster II--Low Educational Achievement, Sparsely Populated Counties would be considered the highest priority when examining comparative educational need. Over half of the adults do not have a high school education and very few of the adults have 4 or more years of college education. These residents are extremely poor as exhibited by the high percentage of households receiving less than $10,000 annual income and a low per capita income. There is also a considerable number of confirmed child abuse cases in these counties. The seriousness of these situations is greater in this cluster than in any other cluster.

Cluster IV is very similar in description to Cluster II, however, Cluster II is experiencing more serious situations. For example, there are fewer adults with 4 or more years of college education in Cluster II than Cluster IV (cluster means of 6.88 and 7.80 respectively) and the percent of adults without a high school education is higher in Cluster II (cluster means of 61.24 and 58.97). The total population in Cluster II is smaller than found in Cluster IV (cluster means of 9,150 and 14,169 respectively) and the number of industrial establishments are lower in Cluster II than in Cluster IV (cluster means of 156 and 225 respectively).

There are existing situations in these counties that may limit the operation of adult education agencies. These limitations include extremely poor residents, sparse populations, and very few industries. The ability for counties to raise their own financial

support for adult education agencies could be extremely limited because of the low number of residents and industries to tax, and the ability of residents to pay taxes.

A sparse population would mean these counties would receive a smaller per capita allocation than counties in other clusters. Because of the great need for raising the educational level of adult residents, a small per capita resource allocation, and the limited ability of these residents to provide financial support to adult education agencies, Cluster II counties would benefit most from increased financial support.

Cluster IV--High Unemployment, Rural Counties would be second in priority for some adult education agencies when examining comparative educational need. Over half of the adults in these counties do not have a high school education, and few adults have 4 or more years of college education. The residents of these counties are extremely poor as exhibited by the high percentage of households receiving less than $10,000 annual income and a low per capita income. The unemployment rate in these counties is extremely high and there are a large number of alcohol and drug related deaths. Child abuse is prevalent in these counties.

As with Cluster II, there are existing situations in these counties that may limit the operation of the adult education agencies. These situations include poor residents, sparse populations, and few industrial establishments. The ability of these counties may be limited in raising financial support for adult education agencies because of the low number of residents and industries to tax, and limited ability of residents to pay taxes. However, all of these limitations are not as serious as those found in Cluster II counties. Therefore, Cluster IV counties may have the ability to collect more funds than Cluster II

counties. And these counties are receiving more of a per capita allocation than Cluster II counties. Cluster IV counties would also benefit from increased financial support.

Cluster I--Urbanized Counties would be third in priority for some adult education agencies when examining comparative educational need even though well over half of the adults have a high school education and a high percentage of adults have 4 or more years of college education. The residents in these counties also have the highest per capita income and contain the lowest percentage of households receiving less than $10,000 annual income. Several social issues exist in these counties. The suicide rate is high, and both the sexually transmitted disease rate and average rate of reported crimes are extremely high.

These are urbanized counties comprised of inner city areas that are commonly populated with extremely poor and undereducated people. What may be masking the educational issues commonly associated with inner cities are the suburban areas with their extremely high income and education levels. Likewise, the extremely high means on crimes, sexually transmitted diseases, and suicides commonly associated with inner cities may be masking the low means associated with the suburban areas.

Because of the possibility of the existence of inner cities with the undereducated and poor residents and the serious social problems, this cluster would be third in priority for receiving increased funds. These counties may appear to be in a much better position to provide adequate support to adult education agencies, because of the high industrialization, population, and income level. However, the counties in this cluster that are not suburban but rather are largely inner city would not be as capable of raising

adequate financial support for adult education agencies. A further examination of the counties comprising this cluster would be necessary to determine which counties exhibit the greatest need for additional funds.

Cluster III--"Typical" Rural Counties would be lowest in priority for some adult education agencies when examining comparative educational need. Approximately half of the adults do not have a high school education and compared to the rest of the state, an average percentage of adults have 4 or more years of college education. The residents are doing relatively weli in terms of personal finances as exhibited by the average percentage of households receiving less than $10,000 annual income and the average per capita income. However, suicide, crimes, and sexually transmitted diseases are prevalent in these counties. The limitations that exist in the other counties are not apparent in these counties. There exists a relatively dense population and the residents earn a relatively high income. The ability of these counties to raise local financial support for adult education agencies would be good.

The per capita allocation received by adult education agencies in these counties have the possibility of being larger than counties in Cluster II or IV. Because the limitations may not be as severe in this cluster as others, increased financial support may not be as critical.

Procedure

Following is a description of the unit of analysis used, the selection and preparation of variables, and the data analysis method. It was decided to use counties as a unit of analysis, because in Georgia, the county governments serve as the main contact

with the state system of government (Hepburn, 1986) and have the power to administer policies and services and some agencies use county lines to determine service areas. Next, various data sources were identified as well as the variables contained in each data set. Some of the data sets examined were: 1980 Census data; *The Georgia County Guide*; *Georgia Statistical Abstract, 1989-1990*; *County Data Base*; *Georgia Descriptions in Data, 1989*, and *A Community Profile for Clarke County*.

Variable Selection

Variable selection began with the formation of a panel of adult education experts. These experts are currently involved in providing adult education programs and are familiar with Georgia counties. A list of candidate variables was suggested by the panel.

The list of candidate variables was refined after reviewing the literature. The literature was used to determine which variables were empirically or logically related to adult education. Because there are no statistical guidelines to follow in selecting variables, the final decision for including a variable was based on the use of subjectively chosen criteria. The criteria were established to increase the validity of the study. One criterion was that the data be objective because objective data are considered to be more reliable than data that are based on attitudes or feelings (Rossi & Gilmartin, 1980). A second criterion was that there exist a logical relationship between the variable and the identified need. If a relationship can be shown, both direct and indirect measures of the need can be used (Rossi & Gilmartin, 1980). A third criterion was that the data must be readily accessible and updated on a regular basis because decision making requires the use of information which is readily accessible (Cross & Hilton, 1983).

Data Preparation

All data were entered into the computer to form a data set and each entry was checked for entry errors and corrections were made. Once the entry errors were corrected, the variables were classified into three groups. The first group of variables were designated as defining variables (e.g., median education level, per capita income, and unemployment rate) and were used in the cluster analysis to construct the clusters. Variables classified as county descriptors (e.g., total county population, total number of industrial establishments, and racial composition) were used to explore the relationship among counties of one cluster and explain the differences between counties of different clusters. The last group includes county name and county number which are the identification variables. These are used to relate data output to the specific counties.

Rate setting

Many of the figures that were entered fluctuated greatly from year to year. In order to provide some stability to the value used in the analysis, an algorithm was devised to derive 3 year average rates for each variable. The reported figures for each variable over a 3 year period starting with the latest entry were used. These figures were averaged to provide some stability to the value used in the analysis which was important if the values varied widely from one year to the next.

It was necessary to form rates for some variables so they would be in an understandable unit of measure. For example, the variable Crime Rate which measures the number of index crimes per county ranged in value from .00014 to .16. The algorithm included 100,000 as a multiplicand so the range became 14.19 to 16,226.60.

After the algorithms for the variables were derived, the calculated values from these algorithms were examined for discrepancies between the calculated and expected values. This was a logical determination. All calculated values appeared reasonable in that there were no exceptionally small or large values. Final selection of the variables used in the cluster analysis, defining variables, was based on conceptual meaningfulness, and potential utility to decision makers. The first step was to examine variables for conceptual meaningfulness and potential utility. It was decided that Alcohol and Drug Related Death Rate, Sexually Transmitted Disease Rate, Suicide Rate, Child Abuse Rate, Ratio of Infant Deaths to Live Births, Crime Rate, Unemployment Rate, Registered Voters, Dropout Rate, Income, Poverty, College, No High School Education, and Median Education Level fit these two criteria. The final selection process involved the use of factor analysis. A discussion of this step follows.

Factor analysis

In order to examine covariation among the variables to determine if an underlying factor existed for logically grouped defining variables, factor analysis was applied. Initially a correlation matrix was determined on the clustering variables. The variables were then grouped based on the results of the correlation matrix and also based on researcher judgment. Alcohol and Drug Related Death Rate, Sexually Transmitted Disease Rate, Child Abuse Rate, and Suicide Rate were grouped because of their relationship to social problems and indirect relationship to educational need. Median Education Level, Percent of Adults with College Education, and Percent of Adults with No High School Education were grouped because of their high correlation value and

logical connection to the need for adult education. Per Capita Income and Percent of Households Receiving Less than $10,000 Annual Income were grouped because of their high correlation values and logical connection to income and indirect relationship to educational need. The grouping would allow for a reduced number of variables used in clustering.

The underlying structure of the three groupings was examined for shared variance in each group in an attempt to reduce the number of variables used in clustering. The grouping comprised of variables indicating social problems did not load satisfactorily, but was retained because of the strong logical connection the four variables have to each other and in recognizing educational need.

An index was formed for each group by multiplying the factor score to the value derived by subtracting the variable mean from the variable value which was then divided by the variable standard deviation (factor score * [variable value-mean/standard deviation]). This was repeated for each variable in a grouping. These figures were then added together to derive the value for the grouping now called an index. Three indices were formed using this process: social problems, education achievement, and income.

After final determination of variables, cluster analysis was used. Cluster analysis was chosen because it provides "an increased understanding and improved organization of known facts permitting a more parsimonious description of the topic under study" (Anderber, 1973). The specific method used was FASTCLUS a SAS program which is a nonhierarchical method.

This method unlike hierarchical methods, allows for correction of a poor initial partition. In the hierarchical methods, counties would have, once assigned to a cluster, remained in the assigned cluster. With FASTCLUS, the iterations allow for recomputation of the means and reassignment of counties allowing for a "tight" fit of county means within the clusters (Aldenderfer & Blashfield, 1989; Anderber, 1973; Everitt, 1980; Lorr, 1983; SAS Institute, 1985). This means that the clustering relocates the counties to other clusters in order to enhance the within cluster similarities and the between cluster dissimilarities so that the clusters contain counties that are more like every other county in that cluster. The within group similarity across a specified list of variables is maximized, while, at the same time, the distance between clusters is maximized when between cluster dissimilarity is maximized (Lorr, 1983). FASTCLUS also results in nonoverlapping clusters or mutually exclusive groups where each county is assigned to one and only one group (Aldenderfer & Blashfield, 1989; Lorr, 1983).

The number of groups is determined by the researcher or results from the clustering program (Aldenderfer & Blashfield, 1989; Everitt, 1980; SAS Institute, 1985). For this study, initially a maximum number of six clusters was chosen by the researcher. The initial cluster analyses were used to determine which variables would define the clusters.

FASTCLUS began by forming six temporary clusters by "guessing the means of the clusters" (SAS Institute, 1985, p. 378). The "drift" option was chosen which allows for continuous passes through the data and the maximum number of passes or iterations specified was 10. Clusters that contained three or fewer counties were considered as

outliers and were deleted. The variables were standardized prior to running the analysis so the mean was zero and the standard deviation was one (Aldenderfer & Blashfield, 1989; Everitt, 1980; SAS Institute, 1985). Standardization is important for two reasons as noted by Aldenderfer and Blashfield (1989).

> Variables with both large size differences and standard deviations can essentially swamp the effects of other variables with smaller absolute sizes and standard deviations. Moreover, distance metrics are also affected by transformations of the scale of measurement of the variables, in that Euclidean distance will not preserve distance rankings. (p. 26)

Six initial cluster seeds were formed by the SAS program. Next the analysis assigned counties to the cluster seed with the nearest mean. County means are computed using the means of the variables for each county. Once all counties had been placed in a cluster, the means of the clusters were calculated by using the means of the counties within the clusters. The means of these clusters replaced the seeds. Again the counties were assigned to the cluster with the nearest mean to form new clusters. The cluster means were recalculated and the counties were reassigned to a cluster with the nearest mean. This was continued until the cluster means were stabilized or the requested iterations were completed (Aldenderfer & Blashfield, 1989; SAS Institute, 1985).

Actual clusters are formed by the calculation of the metric distance of one cluster mean to another and between the cases within a cluster (Aldenderfer & Blashfield, 1989). "Clustering techniques attempt to group points in a multi-dimensional space in

such a way that all points in a single group have a natural relation to one another and points not in the same group are somehow different" (Dubes & Jain, 1976, p. 247). The measurement used to determine distance is Euclidean distance. Euclidean distances are "computed from one or more numeric variables" (SAS Institute, 1985, p. 378). In this study the Euclidean distances are computed on the defining variables.

Cluster Model Determination

The clustering analytical procedure used does not indicate the best number of clusters, and those things best associated with factor analysis such as the scree test are not available for cluster analysis. Consequently, many different analytical models using different combinations of variables and requesting different numbers of clusters were run.

Final determination of the cluster model depended on the researcher's "judgement and subjective evaluation to find regularities and relations 'by inspection'" (Anderber, 1973, p. 176). Through the testing of many cluster models, a "best" solution was selected, based on the criteria of conceptual meaningfulness, potential utility to funding sources, and distinctiveness of identified types.

After determination of which variables to use, analyses were run using the identified variables and indices where two through nine clusters were requested. Each of the solutions was evaluated with the established criterion. If clusters of a given solution were too similar for a decision maker to put to work then an analysis that contained two such clusters was not considered ideal because it did not meet the distinctiveness of type

criteria. Ultimately the solution that was most conceptually clear and had most practical utility was a four cluster solution.

Additional Descriptive Analyses

After the best cluster solution was identified, the county means were calculated for the descriptive variables. Means were also calculated for the individual variables comprising the indices. This was done to provide a fuller description of each cluster type.

Practical Utility of the Typology

A classification system such as the one proposed organizes data into a manageable and sophisticated framework. It is manageable because it examines numerous variables, yet provides a small number of groupings. As such, the groups are described in more detail, which presents an increased understanding of educational needs of these groupings. It is a sophisticated framework because it uses inductive techniques which limit researcher bias, and examines data that are theoretically linked to the issue of concern.

Being able to recognize where educational levels are low or where social and economic conditions are poor, agencies can focus on the critical needs of the counties. The distribution of resources could continue on a per capita basis but the per capita figure could be weighted. For those counties recognized as having the greatest educational need, the weighting figure could be the highest weight assigned to any cluster, and those with the lowest need, the weighting figure could be the lowest figure.

The advantage of weighting is that the basic allocation is adjusted for differences in educational need.

Another option in allocating resources could involve a per capita basis with the individual agencies establishing a special fund that is kept separate and used on a "need" basis. These reserved resources could be distributed according to relative educational need with the larger amounts allocated to the high priority counties. The allocated amounts could be a percentage increase over the per capita allocation with the percentage varying with the priority of the county.

The weighting or the amounts to set aside for each county would be determined by the education agency as it considers the amount of resources needed to achieve goals in each county. In both options, additional resources are not involved but rather a redistribution of existing finite resources. Agencies could go beyond operating at a minimal level to a more optimal level in those counties identified as priority counties, so that programs could be strengthened or expanded. The end result could be a more responsive educational system.

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Table 1

Selected County Data

County	Population	Per Capita Income	% Without High School Education	% Below Poverty	Mean Basic Skills Score
Bartow	51,830	12,129	60.1	12.9	647
Rockdale	51,892	16,269	36.6	8.2	667

Note. From the Georgia County Guide, by D. C. Bachtel (Ed.), 1990, Athens, GA: The University of Georgia Cooperative Extension System.

Table 2

Hypothetical Deductive Classification

Type	Median Yrs. School	Per Capita Income	Rate of Unemployment
I	High	High	High
II	High	High	Moderate
III	High	High	Low
IV	High	Moderate	High
V	High	Moderate	Moderate
VI	High	Moderate	Low
VII	High	Low	High
VIII	High	Low	Moderate
IX	High	Low	Low
X	Moderate	High	High
XI	Moderate	High	Moderate
XII	Moderate	High	Low
XIII	Moderate	Moderate	High
XIV	Moderate	Moderate	Moderate
XV	Moderate	Moderate	Low
XVI	Moderate	Low	High
XVII	Moderate	Low	Moderate
XVIII	Moderate	Low	Low
XIX	Low	High	High
XX	Low	High	Moderate
XXI	Low	High	Low
XXII	Low	Moderate	High
XXIII	Low	Moderate	Moderate
XXIV	Low	Moderate	Low
XXV	Low	Low	High
XXVI	Low	Low	Moderate
XXVII	Low	Low	Low

Table 3

Four Clusters of Georgia Counties as Defined by Their Cluster Means

Variable Description	Cluster Means I	II	III	IV
Three year average rate of index crimes reported times 100,000 population	1.35	-.69	.14	-.42
Three year average civilian labor force unemployment rate	-.88	-.01	-.22	1.95
Three year average rate of number of registered voters times 100 population	-.58	.95	-.51	-.05
Education Achievement Index	1.66	-.65	.00	-.44
Income Index	1.61	-.74	.13	-.58
N	25	51	64	19
% of Sample	15.72	32.07	40.25	11.95

Table 4

Four Clusters of Georgia Counties as Defined by Their Scores on the Five Education-Related Variables

Variable Description	Cluster I	II	III	IV
Three year average rate of index crimes reported times 100,000 population	Very High	Low	--	--
Three year average civilian labor force unemployment rate	Low	--	--	Very High
Three year average rate of number of registered voters times 100 population	Low	High	Low	--
Education Achievement Index	Very High	Low	--	--
Income Index	Very High	Low	--	Low
N	25	51	64	19
% of Sample	15.72	32.07	40.25	11.95

Note: N=159. Cluster means were considered to be: (a) average--indicated in the table by a dash--if they fell within a half a standard deviation of the group mean; (b) high (or low) if they were at least one-half but less than one full standard deviation above (or below) the mean; and (c) very high (or very low) if they were a standard deviation or more above (or below) the mean.

Table 5

Cluster Means of the Defining Variables for the Four Clusters of Georgia Counties

Variable Description	Cluster Means I	II	III	IV	Total Group Means
Percent of Those 25 Years and Older with 4 or More Years of College	15.53	6.88	8.59	7.80	9.04
Median Education Level	12.27	10.54	11.21	10.65	11.09
Percent of Those 25 Years and Older Without a High School Education	38.80	61.24	55.58	58.97	55.16
Per Capita Income	14,899.00	10,360.00	11,657.00	10,391.00	11,599.00
Average Rate of Reported Crimes	6,228.00	1,430.00	3,389.00	2,046.00	3,046.00
Percent of Households Receiving Less than $10,000 Annual Income	16.96	31.72	24.78	29.74	26.37

(table continues)

Table 5 (continued)

Variable Description	Cluster Means I	II	III	IV	Toal Group Means
Average Rate of Unemployment	4.92	6.42	6.06	9.80	6.44
Average Rate of Registered Voters	41.95	55.46	42.52	46.58	47.06

Table 6

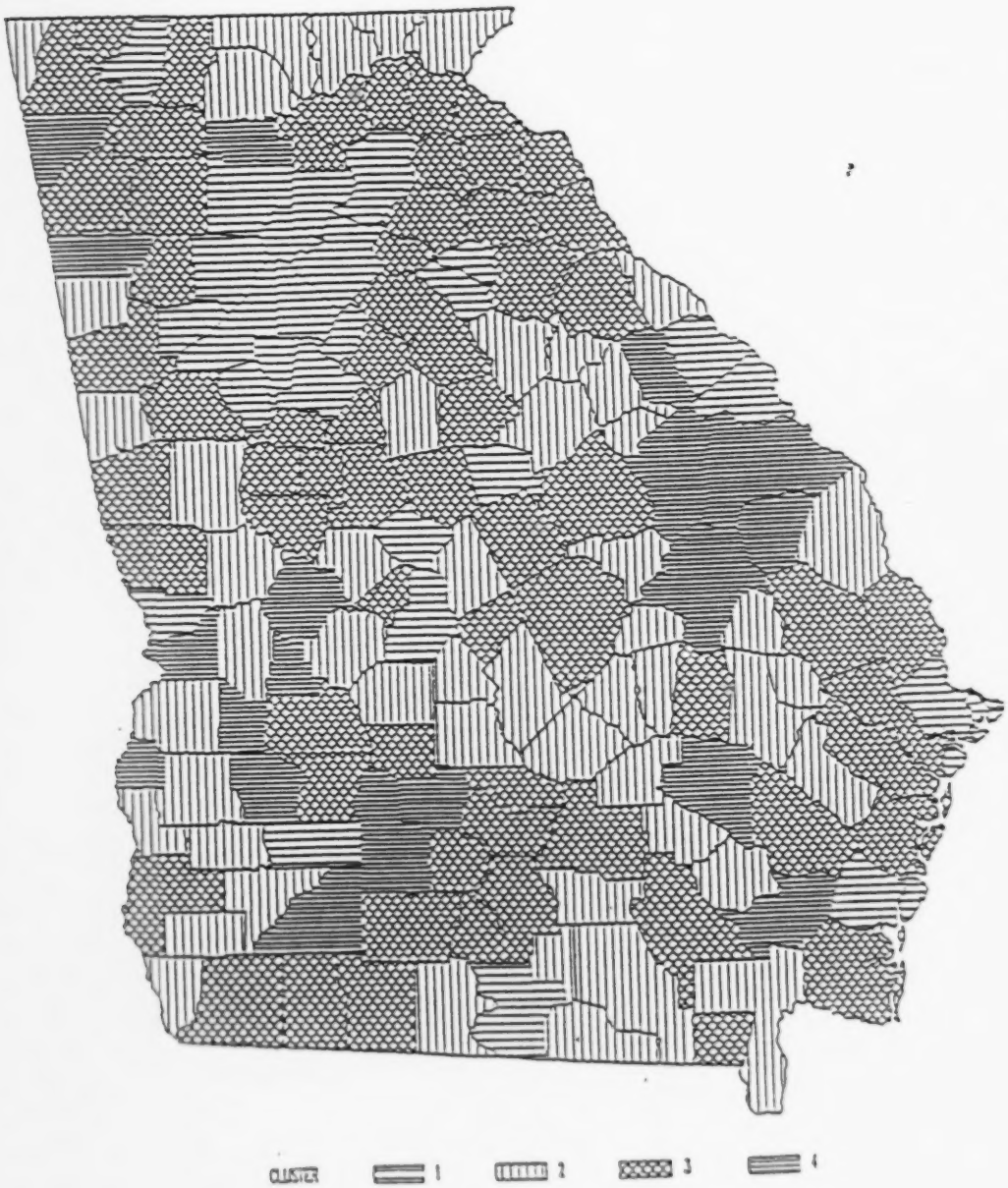
Cluster Means of the Descriptive Variables for the Four Clusters of Georgia Counties

Variable Description	Cluster Means I	II	III	IV	Total Group Means
Total Population, 1990	159,868	9,150	27,275	14,169	40,743
Percent Black, 1990	22.13	32.22	23.20	35.70	27.42
Percent Other, 1990	2.13	0.73	0.94	1.04	1.07
Percent Hispanic, 1990	1.73	0.99	0.99	1.10	1.12
Percent of Population in Urban Areas, 1980	61.60	14.49	32.72	25.74	30.58
Percent of Population in Rural Areas, 1980	38.40	85.51	67.28	74.26	69.42

(table continues)

Table 6 (continued)

Variable Description	Cluster Means I	II	III	IV	Total Group Means
Percent of Population on Farms, 1980	1.01	7.67	4.71	7.83	5.45
Sexually Transmitted Disease Rate	1,524.71	635.81	889.49	624.31	876.31
Number of Inmates in State Prisons	412	18	61	28	98.31
Suicide Rate	13.44	11.40	13.53	12.71	12.73
Average Rate of Confirmed Child Abuse Cases	273.46	518.78	387.38	460.08	420.30
Dropout Rate	5.52	5.48	6.64	6.24	6.04
Average Rate of Alcohol and Drug Related Deaths	12.55	12.19	12.97	14.38	12.85



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